

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 37

UNITED STATES PATENT AND TRADEMARK OFFICE

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**PAT. & T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES**

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES M. CLEEVES

Appeal No. 2003-1081
Application 08/581,347

ON BRIEF

Before OWENS, TIMM and MOORE, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

ON REQUEST FOR REHEARING

The appellant requests reconsideration of the new rejection of claims 21-40 under 35 U.S.C. § 112, second paragraph, which we introduced in our decision mailed May 30, 2003 (paper no. 32).¹

As we stated in our decision (page 5), "[w]hen a word of degree such as "substantially" is used in a claim, the specification must provide some standard for measuring that

¹ We treat this request as a request for rehearing under 37 CFR § 1.197(b) (1997).

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degree such that one of ordinary skill in the art would understand what is claimed when the claim is read in light of the specification. See *Seattle Box Co. v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 826, 221 USPQ 568, 573-74 (Fed. Cir. 1984).

The appellant does not argue that the specification provides a standard for measuring the degree encompassed by "substantially uniform" or "substantially uniformly" in their claims. Instead, the appellant argues, in reliance upon *Verve LLC v. Crane Cams Inc.*, 311 F.3d 1116, 1120, 65 USPQ2d 1051, 1054 (Fed. Cir. 2002), that extrinsic evidence can be relied upon to interpret claim language (request, page 3). Although the court in *Verve* stated that "[u]nderstanding of this scope may be derived from extrinsic evidence without rendering the claim invalid", see *id.*, the court stated that "reference to intrinsic evidence is primary in interpreting claims". See *Verve*, 311 F.3d at 1119, 65 USPQ2d at 1053. The extrinsic evidence relied upon by the appellant does not indicate that the appellant's claim terms "substantially uniform" and "substantially uniformly" would have been reasonably clear to one of ordinary skill in the art in view of the appellant's specification.

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The extrinsic evidence relied upon by the appellant is a Rule 132 declaration by Krishnaswamy Ramkumar, an employee of the appellant's assignee (request, page 3). Ramkumar states that he and others in the field would have considered the appellant's claim terms "substantially uniform" and "substantially uniformly" to mean that the temperature difference across the substrate is less than 10°C, which is a uniform enough temperature that the etching of different parts of the substrate would not be uncontrollable (declaration, page 3).

The only evidence of record that appears relevant to the controllability referred to by Ramkumar is the following portion of the appellant's specification which pertains to etching, with a fluorine-based plasma, a layer of tungsten on a wafer (page 2, lines 11-18):

The reaction between the plasma and the wafer, as well as the power dissipated to the wafer surface, causes the temperature of the wafer to rise. As the temperature of the wafer increases, the selectivity to the underlying layers of the wafer decreases causing the etching to become uncontrollable. Because the etching process is temperature sensitive, it is desirable to provide a mechanism for controlling the temperature of the wafer as well as for maintaining a substantially uniform temperature across the wafer."

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This disclosure does not indicate that "substantially uniform" and "substantially uniformly" encompass any temperature distribution across a wafer that is sufficiently uniform to prevent the etching from being uncontrollable. The disclosure merely indicates that a wafer control mechanism is desired to prevent the etching from becoming uncontrollable, and that it is additionally desired to maintain a substantially uniform temperature across the wafer.

The specification indicates that wafer temperature control can be provided by introducing an inert gas between a cooled lower electrode and the wafer (page 2, lines 19-24), and that the heat transfer provided by this temperature control mechanism is nonuniform because the gas causes the center portion of the wafer to bow out slightly from the cooled lower electrode (page 3, lines 1-8). The specification indicates that a substantially uniform heat transfer and, accordingly, substantially uniform wafer temperature, when the wafer bows out slightly at its center, can be obtained by using the appellant's heat transferring seal having a thermal conductivity closely matching that of the gas (page 4, lines 7-14; page 9, lines 1-8).

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However, as explained in our decision, the specification does not provide a standard for measuring the degree encompassed by "substantially uniform" or "closely matching".

As for Ramkumar's statement that the substrate temperature is not uncontrollable if the temperature difference across the substrate is less than 10°C (declaration, page 3), there is no support for this statement in the appellant's specification. The support relied upon by Ramkumar comes from U.S. patent no. 5,698,070 to Hirano et al. (Hirano), which is of record.

Ramkumar argues that Hirano "describes the same problem as the above identified application (see, for example, col. 1, lines 25-33)" (declaration, page 3). Actually, the problem described in the portion of Hirano relied upon by Ramkumar is opposite to that described in the appellant's specification. The appellant describes a problem of the temperature and, therefore, the etching rate, at the center of a wafer being higher than at the periphery because the center of the wafer bows out and, consequently, is spaced apart from a cooling electrode (specification, page 3, lines 1-8). Hirano describes a problem of the etching rate of a wafer being higher at the periphery than at the center "because the amount of etching gas supplied, the

density of plasma, and temperature on the surface of the wafer cannot be kept uniform" (col. 1, lines 26-33).

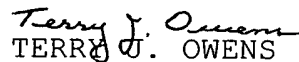
Ramkumar argues that "[a] temperature difference of less than 10 degrees Celsius between different parts of the substrate as being sufficiently uniform that the etching of different parts of the substrate would not be uncontrollable, is consistent with this reference [Hirano] (see, for example, col. 10, lines 1-35)" (declaration, page 3). This portion of Hirano may be consistent with the etching of different parts of a substrate being controllable, but it says nothing about etching controllability. What this portion of Hirano discloses is that the temperature difference between the periphery and center of a wafer can be 10-40°C, and that as the pressure of a heat exchanging gas at the backside of the wafer is increased from 5 Torr to 15 Torr, this temperature difference decreases from 20°C to less than 10°C.² This portion of Hirano does not indicate that one of ordinary skill in the art would have considered any temperature difference across a substrate of less than 10°C to be substantially uniform.

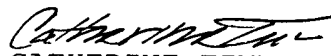
² The appellant's heat transfer gas typically is maintained at 0.1-15 Torr (specification, page 2, lines 24-25).

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We have reconsidered our new rejection under 35 U.S.C. § 112, second paragraph, in response to the appellant's request for reconsideration but, for the above reasons, we are not convinced of error in the rejection. Accordingly, we hereby make final the rejection of claims 21-40 under 35 U.S.C. § 112, second paragraph.

DENIED


TERRY J. OWENS
Administrative Patent Judge


CATHERINE TIMM
Administrative Patent Judge


JAMES T. MOORE
Administrative Patent Judge

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Sonnenschein, Nath & Rosenthal, LLP
P.O. Box 061080
Wacker Drive Station, Sears Tower
Chicago, IL 60606-1080

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